

NEW GALL-FORMING THYSANOPTERA OF AUSTRALIA.

By DUDLEY MOULTON.

(Communicated by W. W. Froggatt.)

(Plate ix and fourteen Text-figures.)

[Read 25th May, 1927.]

The gall-making thrips of Australia include some of the most interesting forms of all the Thysanoptera, and I am greatly indebted to Mr. W. W. Froggatt who has supplied me with abundant material of many species, several of which are new. I am offering this brief paper as a preliminary one and hope it will help to stimulate other entomologists to collect and study these thrips whenever they are observed. I wish here to express my appreciation to Dr. H. Priesner for examining many of these specimens.

KLADOTHRIPS AUGONSAXXOS, n. sp. (Plate ix, No. 1347.)

This species of *Kladothrips* can be distinguished from *K. rugosus*, the one other known species of this genus, also found by Mr. Froggatt, by the following characters:

K. rugosus Froggatt.

All antennal segments except the first, more or less uniformly light yellow to yellowish brown.

Pterothorax and first two or three abdominal segments yellow, or yellowish orange. Middle and hind legs uniformly dark brown.

K. augonsaxxos n. sp.

Third antennal segment, also sometimes tip of two, yellow, all others dark brown.

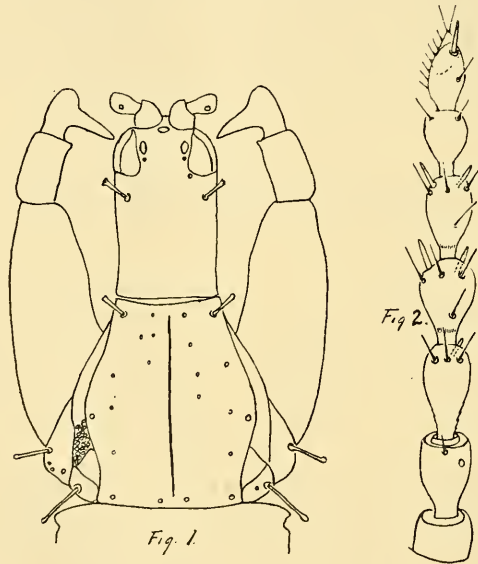
Pterothorax and abdominal segments quite uniformly dark brown. Tips of middle and hind tibia and tarsi often yellowish.

The most striking difference is the enlargement of the egg sac in the abdomen of *K. augonsaxxos* which I have never before observed among the Thysanoptera. The abdomen is normal in one specimen before me, apparently before the development of the egg sac. Its sides are almost parallel, being reduced gradually from the sixth to ninth segments and there is no apparent distention of the connecting tissue between the segments. In other specimens the egg sac is variously enlarged, although the chitinous walls of the segments do not appear to lose their original shape. In one specimen which is typical, the connecting tissue between segments three and four is distended and forms a small, transparent ring extending entirely around the body. The connecting tissue between segments four and five is distended into a larger transparent ring which could possibly contain a single row of eggs, placed end to end. The great spherical egg sac formed between segments five and six is three or four times the width of the body in diameter, tough and strong, whitish, almost transparent in colour, and is seen to contain a great mass of eggs. Segments six to nine and the tube appear to retain their normal shape and size.

Female holotype.—Measurements: Total body length in normal condition about 2.60 mm., with distended egg sac about 2.75 mm. Head length 0.33 mm., width 0.165 mm.; prothorax length 0.33 mm., width 0.36 mm., including prominent fore coxae, 0.45 mm.; width of pterothorax 0.45 mm.; tube length 0.20 mm., width at base 0.08 mm. Antennae, length (width) segment i, 30 microns (39 microns); ii, 60 (38); iii, 75 (33); iv, 69 (36); v, 63 (32); vi, 48 (30); vii and viii, 72 (27); total 435 microns. Length (width) of femora, fore femora 416 μ (133 μ), middle femora 135 μ (63 μ); hind femora 225 μ (90 μ).

Colour dark brown. Extreme tips of fore femora, fore tibia and tarsi including tarsal claws, also third segment of antenna and extreme tip of two orange yellow. Fore coxae, pterothorax except outer borders, extreme bases and tips of middle and hind tibia, and middle and hind tarsi light brown. Connecting tissue between abdominal segments light brownish yellow, especially conspicuous after the egg sac begins to form.

Head about as long as prothorax and half as wide, with straight, almost parallel sides (Text-fig. 1). Postocular spines short and stumpy with dilated tips,



Kladothrips augonsaxos, n. sp.
Fig. 1. ♀ Head and prothorax, dorsal view.
Fig. 2. ♀ Right antenna, dorsal view.

situated well back from the eyes. Eyes comparatively small, neither prominent nor protruding, with small facets, not pilose. Anterior ocellus on apex of head, posterior ocelli contiguous with inner margins of eyes. Mouth cone short, triangular, reaching hardly one-third the length of the prosternum, with bluntly rounded tip. Antenna apparently 7-segmented. The terminal segment has a distinct transverse, oblique suture indicating clearly that it is formed by the fusion of the two terminal segments. (This is also true of the antennae of *K. rugosus* Froggatt, specimens of which are before me.) Antennae about one and one-third times as long as head; segment three club-shaped, segments four,

five and six abruptly constricted, each at about one-fourth its length from the base, these narrowed portions cylindrical, the rest of the segments subglobose. Segment three with one simple sense cone near tip on ventral side, segments four and five each with two, and segment seven with one. All sense cones short and transparent (Text-fig. 2).

Prothorax, not including prominent coxae, somewhat wider than long, shield-shaped, with a distinct median longitudinal thickening. Prominent spines on anterior and posterior angles, also on prominent coxae. All spines stout and transparent, with blunt tips, those on posterior angles 75 microns long. Pterothorax as wide as prothorax and fore coxae combined, sides almost parallel with a small angular indentation in the middle on either side. Anterior legs much enlarged, fore femora about one-fourth longer than head and three-fourths as wide as width of head. Armature of fore tibia reduced to blunt inconspicuous knobs at end on inner side. Claws of fore tarsi are long, straight and pointed, as long or longer than length of tarsi, and project at right angles. Middle legs much reduced, the median femora smaller than the fore tibia; posterior legs somewhat larger. Wings well developed, entirely clear, not narrowed in the middle, with ten double fringe hairs along posterior margin near tip.

Abdomen of normal shape before the formation of egg sac. Tube almost two-thirds as long as head.

This thrips is a true gall maker and produces a spherical gall from one-half to three-quarters of an inch in diameter, hollow, with an outer shell wall of about one-sixteenth of an inch in thickness. The gall is a deformity growing out of the leaf. One female inhabits each gall; she scatters her eggs, hundreds of them, on the inner surface where the larvae hatch, and apparently feed as I have found larvae within the parent gall in all stages.

No males have been observed.

Female holotype in author's collection; paratypes in the Froggatt Collection, Canberra, Australia.

Hostplant: Gallmaker on *Acacia doratoxylon*.

Habitat: Gilgandra, New South Wales.

CHOLEOTHRIPS, new genus (No. 518).

(Sub-family Kladothripinae.)

Head one and one-third times as long as wide and slightly shorter than prothorax, broadest across at the eyes, constricted uniformly toward the base. Cheeks with several thorn-like bristles, a single pair about one-third the length of the head from posterior margin, long and conspicuous and almost one-half as long as prominent postoculars. Eyes large. Ocelli present. Mouth cone short, reaching about two-fifths the length of the prosternum, bluntly rounded, labrum blunt.

Prothorax shield-shaped. Fore coxae enlarged, prominent, and together with the prothorax wider than the pterothorax. Fore femora greatly thickened. Fore tibia stout and armed at the end within with a strong tooth. Each fore tarsus with two teeth. Wings not constricted sole-shaped, but still a little smaller in the middle. Tube almost as long as head. Type: *Choleothrips geijerae* n. sp.

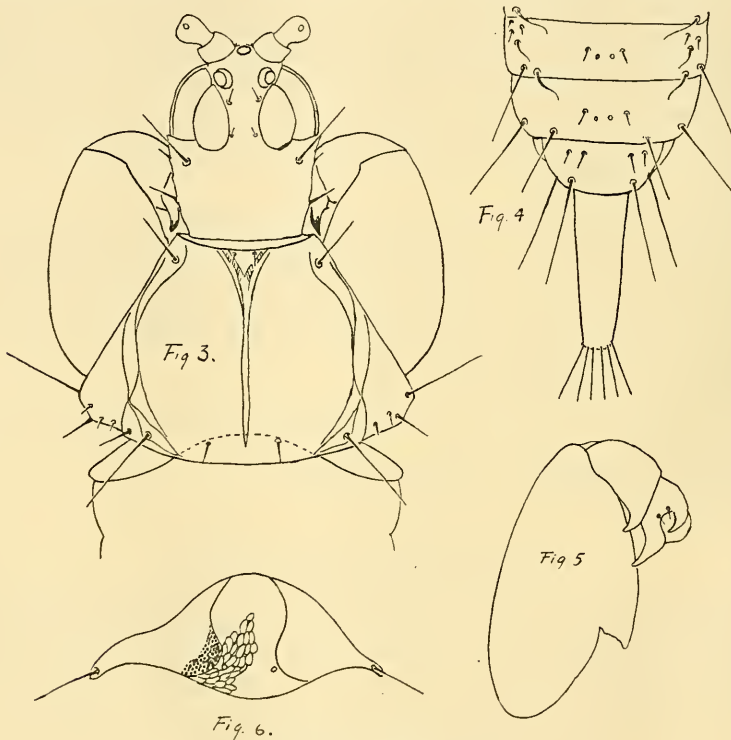
CHOLEOTHRIPS GEIJERAE, n. sp. (Plate ix, No. 518).

Female holotype.—Measurements: Total body length 2.42 mm. Head length 0.33 mm., width 0.25 mm.; prothorax length 0.36 mm.; width 0.416 mm.; including

coxae 0.55 mm.; mesothorax width 0.52 mm.; abdomen width 0.416 mm. Antennae: Segment i 27 microns, segment ii 54 microns, other segments broken off. Legs, fore femora length 0.41 mm., width 0.20 mm.; middle femora length 0.23 mm., width 0.10 mm.; hind femora length 0.33 mm., width 0.12 mm. Tube length 0.315 mm., width near base 0.09 mm.

Colour: Prothorax and fore legs quite uniformly yellowish brown; head, first antennal segments, pterothorax, abdomen, middle and hind legs dark brown, with joints and tarsi of middle and hind legs lighter. Wings uniformly smoky coloured. All prominent spines yellow. (Two paratype specimens have the prothorax and fore legs dark brown like the rest of the body.)

Head one-third longer than greatest width across at the eyes, constricted posteriorly (Text-fig. 3). Postocular spines pointed, 90 μ long. Longest cheek



Choleothrips geijerae, n. sp.
 Fig. 3. ♀ Head and prothorax, dorsal view. Fig. 4. ♀ Tip of abdomen, dorsal view.
 Fig. 5. ♀ Right fore leg, ventral view. Fig. 6. ♀ First segment of abdomen, dorsal view.

spines 39 μ long. Eyes large, occupying four-fifths the width and about four-ninths the length of the head. Facets very small, not pilose. Ocelli present, placed well forward on head, anterior one on apex, posterior ocelli contiguous with anterior inner margins of eyes; mouth cone short, rounded, labrum blunt. There are two distinct swellings ventrally, one on either side of the head, just anterior to the base of the mouth cone. Antennae 8-segmented. Unfortunately the antennal segments beyond the second joint have been broken from all of the specimens before me.

Prothorax distinctly shield-shaped, one-eighth wider than long but about one-third wider than long when the fore coxae are included. A prominent spine on each fore angle, 90 μ long and one on each posterior angle 180 μ . Long spines on angle of fore coxae 135 μ . All spines pointed. The median dorsal suture terminates in front in a triangular enlargement with distinct sculpturing. Mesothorax widest, excluding protruding fore coxae of prothorax, with sides almost parallel. Metathorax with sides tapering gradually to meet the more slender abdomen. Fore femora greatly enlarged, about four-fifths as wide as head and nearly one-third longer (Text-fig. 5). Fore tibia enlarged and armed with a strong curved tooth at the end on the inner margin. Fore tarsi each armed with two teeth, the larger inner one almost as long as the width of the tarsus and with a curved tip, the outer smaller one on the ventral or outer side. The middle and hind legs are much smaller with clearly enlarged femora but small in comparison with the fore pair. Wings fully developed, reaching nearly to tip of abdomen with sides almost parallel; twenty-eight accessory hairs on posterior margin of fore pair.

Abdominal segments three to seven inclusive, are almost equal in length and width, and have parallel sides. Segment two is subequal in width but longer. The tergum of segment one is broad in the centre but compressed to curved points on either side, each bearing a long spine 0.93 mm., with distinct sculpturing (Text-fig. 6). The tube is almost as long as the head with straight sides tapering only slightly toward the tip. The long spines of the ninth segment reach approximately four-fifths the length of the tube, spines on the end of the tube are somewhat shorter (Text-fig. 4).

Described from twelve females, including holotype, with prothorax and fore legs distinctly yellowish, and two paratypes with prothorax and fore legs concolorous with the rest of the body. Holotype in author's collection. Several paratypes in Froggatt Collection, Canberra, Australia.

Hostplant: *Geijera parviflora* (Wilga), forming rolled leaf galls.

Habitat: Gunnedah, New South Wales (W. W. Froggatt).

DOLEROTHRIPS (?) GEIJERAE, n. sp. (Plate ix, No. 518.)

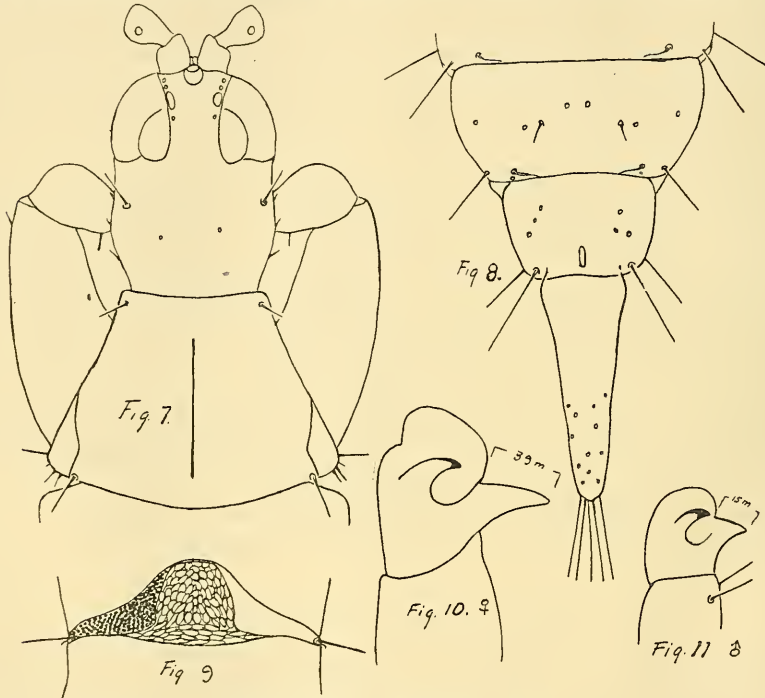
Female holotype.—Measurements: Total body length 2.48 mm. Head length 0.30 mm., width 0.20 mm.; prothorax length 0.30 mm., width 0.30 mm., and 0.36 mm., including fore coxae; mesothorax width 0.55 mm. Antennae: Segment i, 36 microns, segment ii 54 microns, other segments broken off. Legs, fore femora length 0.31 mm., greatest width 0.12 mm.; middle femora length 0.21 mm.; greatest width 0.09 mm.; hind femora length 0.25 mm., greatest width 0.12 mm. Tube length 0.33 mm., width 0.10 mm. across swollen part near base and 0.06 mm. just before tip.

Colour quite uniformly deep brown, wings transparent to slightly smoky.

Head almost one-half longer than width across at eyes. Cheeks swollen in the middle and clearly constricted toward the base, with several short sharp spines. Postocular spines not conspicuous, set back from eyes about one-third the distance between posterior margin of eyes and posterior margin of head. Eyes large occupying two-thirds the width and one-third the length of the head. Outer border of eyes clear light yellow, facets very small; not pilose. Ocelli present, placed well forward on head, anterior one on apex but not protruding over basal segments of antennae, posterior ocelli contiguous with inner anterior margins of

eyes (Text-fig. 7). Mouth cone short, rounded labrum blunt. Antennae 8-segmented.

Prothorax shield-shaped, as wide as long but about one-fifth wider with the prominent fore coxa included. Spines on fore angles weak, spines on posterior angles pointed, 60 m. long, several short stout spines on angles of fore coxa, longest 40 m. Median dorsal thickening fades in front a short distance before the anterior margin but extends almost to the posterior margin of the prothorax. Mesothorax with rounded anterior angles, sides of both meso- and meta-thorax constricted gradually toward the posterior margins. Fore femora enlarged, as long as head. Fore tibia unarmed; fore tarsi each with two



Dolerothrips (?) *geijerae*, n. sp.

Fig. 7. ♀ Head and prothorax, dorsal view. Fig. 8. ♀ Tip of abdomen, dorsal view. Fig. 9. ♀ First segment of abdomen, dorsal view. Fig. 10. ♀ Tip of right fore tibia and tarsus, ventral view. Fig. 11. ♂ Tip of right fore tibia and tarsus, ventral view.

teeth, the larger more conspicuous one extends outward at right angles and is nearly straight, the terminal smaller ventral one is distinctly curved (Text-fig. 10). The middle and hind legs are strong, with femora enlarged, but small in comparison with the fore femora. Wings fully developed, reaching to middle of seventh segment, sides almost parallel, 21 double fringe hairs on posterior margin of fore wing.

Abdomen elongate, first segment broad in the centre and narrowed to a point on either side, it displays distinct sculpturing and bears a single long yellow spine at each outer angle (Text-fig. 9); segments two to six increase in width gradually, and seventh, eighth and ninth with sides rounded and clearly

narrowed posteriorly; tergites of segments two to nine more or less distinctly reticulated; tube slightly longer than head, swollen at the base, narrowed gradually to a rounded tip (Text-fig. 8).

Male: The male is somewhat smaller, about 1.88 mm. in length, similar in colour and shape. The fore tarsus is smaller and tarsal tooth is about one-half as large as in female (Text-fig. 11).

Described from nine females and three males.

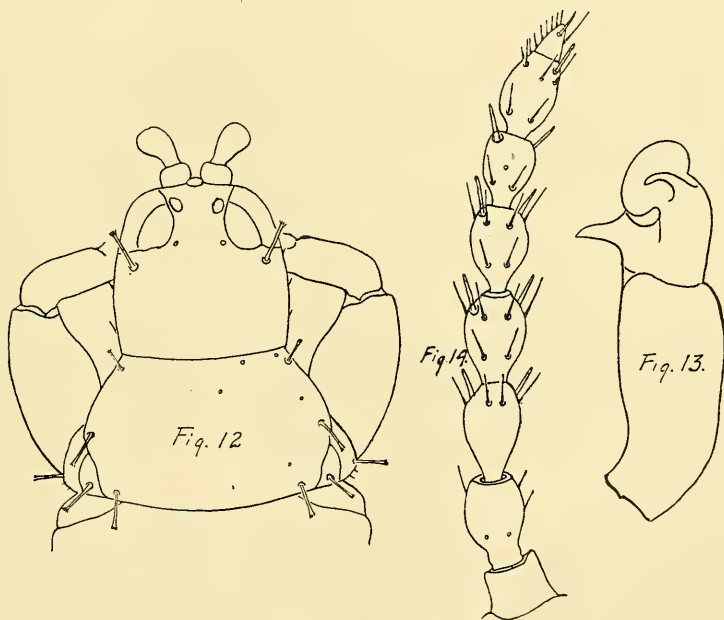
Holotype in author's collection. Paratypes in the Froggatt Collection, Canberra, Australia.

Hostplant: *Geijera parviflora* (Wilga), found in company with *Choleothrips geijerae* forming rolled leaf galls.

Habitat: Gunnedah, New South Wales.

EOTHrips BURSARIAE, n. sp. (No. 516.)

Female holotype.—Measurements: Total body length 1.66 mm. Head length 0.21 mm., width 0.20 mm.; prothorax length 0.166 mm., width 0.33 mm.; mesothorax width 0.38 mm. Tube length 0.183 mm., width 0.08 mm. Antenna length (width) segment i, 30 microns (33 microns); ii, 48 (36); iii, 54 (36); iv, 48 (39); v, 48 (36); vi, 42 (33); vii, 48 (27); viii, 24 (18); total length 345 microns.



Eothrips bursariae, n. sp.

Fig. 12. ♀ Head and prothorax, dorsal view. Fig. 13. ♀ Left fore tibia and tarsus, ventral view. Fig. 14. ♀ Right antenna, dorsal view.

Colour brown to dark brown with tips of fore tibia, all tarsi and segments three to five and sometimes six lighter. Wings uniformly light smoky grey. Prominent spines yellow to yellowish brown. Body with numerous orange pigment spots or blotches visible in light coloured specimens.

Head broadly rounded with cheeks slightly arched, broadest across middle line, dorsum with numerous confluent cross striations; postocular spines rather short, stump with dilated tips; cheeks with several short spines. Eyes occupying three-eighths the length of the head, with small facets, indistinctly pilose. Ocelli placed far forward, posterior ocelli contiguous with anterior inner margins of eyes, with dark orange red crescents (Text-fig. 12). Mouth cone reaching posterior third of prosternum, bluntly rounded labium but with pointed labrum. Antennae 8-segmented, approximately one and two-thirds times longer than head, all segments comparatively stout, fourth segment almost five-sixths as wide as long. Two sense cones on segments three, four, five and six, one on segment seven, all are short, blunt and transparent (Text-fig. 14).

Prothorax almost as long as head but noticeably wider, with sides diverging posteriorly. Spines on anterior angles short, mid-laterals a little longer, those on posterior angles longest, all, however, are short, stocky and with dilated tips; each prominent angle of fore coxa also has a similar blunt tipped spine and two or three short pointed ones. Pterothorax broadest, sides almost parallel, converging only slightly near posterior line. Legs rather short, fore femora thickened, fore tibia unarmed, fore tarsi armed each with a spur-like tooth on inner margin and a smaller horn-shaped tooth near tip on ventral side (Text-fig. 13). Wings fully developed, broad, with parallel sides, not constricted in the middle, with ten or twelve double fringe hairs.

Abdomen almost as wide as pterothorax, first seven segments of equal width, eight and nine conspicuously narrowed. Tube slightly shorter than head. Two prominent spines on each posterior angle of segments two to nine, the outer shorter ones (33 microns on segment two) gradually become longer until they reach a maximum length of 111 microns on segment nine; the inner ones, 60 microns on segment two, increase to a maximum length of 135 microns on segment nine, both pairs have blunt or dilated tips. Segments two to seven also have two additional pairs of curved spines on either side, the posterior pair on each segment much stronger than the anterior pair. The longest spines on the end of the tube are two-thirds as long as the tube, 135 microns.

The male is very similar to the female, although somewhat smaller, the abdomen decreases in width gradually from the fourth segment to the tube.

Described from numerous females and males taken from galls on leaves of *Bursaria spinosa* (Native blackthorn) at Warrah and Sydney, New South Wales, Australia, by W. W. Froggatt.

Holotype in author's collection. Paratypes in the Froggatt Collection, Canberra, Australia.

EXPLANATION OF PLATE IX.

No. 518. Rolled leaf galls on *Geijera parviflora* (Wilga) made by *Choleothrips geijerae* and *Dolerothrips geijerae*. Natural size.

No. 1347. Galls on *Acacia doratoxylon* made by *Kladothrips augonsaxos* Moulton. Slightly enlarged.
